

From: HOPE Bruce
To: [Eric Blishcke/R10/USEPA/US@EPA](mailto:Eric.Blishcke/R10/USEPA/US@EPA)
Subject: RE: Meeting Agenda for Tomorrow's Food Web Model Meeting
Date: 11/28/2005 03:36 PM

Eric,
Got your voice message. Don't have any major changes other than I think we should focus the discussion on how we move this thing forward. I did finish a prototype T&F model over the holiday, so we could talk about that aspect of the overall model effort too.
Bruce

-----Original Message-----

From: Blishcke.Eric@epamail.epa.gov
[mailto:Blishcke.Eric@epamail.epa.gov]
Sent: Monday, November 28, 2005 10:00 AM
To: PETERSON Jenn L; HOPE Bruce; Shephard.Burt@epamail.epa.gov
Subject: Meeting Agenda for Tomorrow's Food Web Model Meeting

Here is a draft agenda for tomorrow's meeting. The meeting will begin at 10:00 at DEQ NWR Conference Room 1A and will go as long as necessary (late afternoon).

Review Food Web Model Objectives and Specifications (all) Summarize November 2005 Food Web Model Report (Bruce Hope) Discuss what changes are needed to meet objectives and specifications (all)
Discuss relationship between contaminant fate and transport model and food web model Identify Data Gaps - Distinguish between data gaps related to Food Web Model and to Fate and Transport Model Discuss Next Steps - EPA comments on Food Web Model and path forward.

I have pasted some of our earlier direction to the LWG below. Please provide me with any thoughts you have on the agenda and I will forward to the entire team later today.

Thanks, Eric

Objectives:

- 1) Evaluation of the impact of various source control activities and remedial action alternatives on fish tissue concentrations.
- 2) Relative ranking of risks from various sites and/or chemicals to human and ecological receptors.
- 3) Prediction of benthic invertebrate and/or fish tissue contaminant levels (or ingested doses) in species or at locations where little data exists or will not be collected (e.g., sturgeon).
- 4) Back calculation of acceptable sediment and/or water concentrations based on acceptable fish tissue concentrations.
- 5) Identification of data gaps.

Specifications:

- 1) Transparency - full documentation including all equations, code and assumptions for input parameters.
- 2) Ability to link the model output to sediment and water fate and transport models.
- 3) Ability to incorporate spatial variability (e.g., ISA or site-wide vs. specific areas, SMAs or hot spots).
- 4) Ability to incorporate temporal variability (e.g., temperature, flow, concentration, TSS, TOC, DOC, menu, lipid content).
- 5) Ability to calculate and express results as concentration or mass.
- 6) Ability to consider intra-trophic and up-trophic consumption.
- 7) Ability to evaluate organics (including PAHs) mercury and other metals in addition to bioaccumulative organics.
- 8) Ability to treat invertebrates as whole organisms
- 9) Ability to model from fish to bird to eggs.

EPA believes another currently available "off-the-shelf" model (EcoFate) should be evaluated to determine the extent to which it may meet these specifications. EcoFate is essentially an extension of the original Gobas (1993) model as modified by Morrison et al. (1996) and is thus not a radical departure from those models that have already been evaluated. Importantly, EcoFate links a Gobas based food web model with a contaminant fate and transport model. This concept was touched on during our June 8th meeting but perhaps was not fully discussed. EPA believes that it is critical that the food web model application be linked in some way with a contaminant fate and transport model to meet the objectives and specifications. For example, EcoFate allows the site to be subdivided in order to evaluate the impact of remediating contaminated sediments or controlling sources at specific locations within Portland Harbor. The following cursory examination of EcoFate's capabilities relative to the specifications suggests that it too should be evaluated with respect to its applicability to Portland Harbor.

Transparency - full documentation including all equations, code and assumptions for input parameters. The documentation provided with the model download (from the website) is just sufficient to guide running the model. The underlying Excel spreadsheets (data sources) are accessible but the underlying code is not. However, a published use of the model (Gobas et al., Environ. Sci. Technol. 32: 2442-2449, 1998) provides a more complete description of its operation and use; its algorithms are detailed in supporting information available on-line.

Ability to link the model output to sediment and water fate and transport models. EcoFate includes a basic transport and fate model

which uses mass balance principles and some simplifying assumptions (e.g., complete mixing, maintenance of sediment mass balance, etc.). This simpler approach may be adequate at this early stage in the application of models to Portland Harbor.

Ability to incorporate spatial variability (e.g., ISA or site-wide vs. specific areas, SMAs or hot spots). The model is geographically-explicit in that it allows for segmentation of a river into multiple user-defined compartments, including tributaries. The ability of EcoFate to correctly handle the back eddy in a tidally influenced river system would need to be further evaluated.

Ability to incorporate temporal variability (e.g., temperature, flow, concentration, TSS, TOC, DOC, menu, lipid content). EcoFate is capable of producing estimates of concentrations over time that vary in response to changes in these parameters.

Ability to calculate and express results as concentration or mass. EcoFate has this capability.

Ability to consider intra-trophic and up-trophic consumption. Possibly but not clear in the examples available.

Ability to evaluate organics (including PAHs) mercury and other metals in addition to bioaccumulative organics. EcoFate can handle hydrophobic organic chemicals and weak organic acids and bases but not speciating metals.

Ability to treat invertebrates as whole organisms. Yes, because EcoFate includes the Morrison modifications.

Ability to model from fish to bird to eggs. Possibly. EcoFate can model from adult fish to fish embryo in egg. It should be possible to extend this to include birds and their eggs.

It is unclear whether the most recent version of EcoFate includes the modifications described in Arnot and Gobas (2004). In addition to the evaluation of the EcoFate model, EPA believes that the limited amount of benthos present in sediments of the harbor (clams and crayfish excepted) leads to uncertainty regarding the relative importance of benthic vs. pelagic species in the diet of fish. As a result, EPA recommends that food webs that emphasize zooplankton and bryozoans should need to be evaluated.

Finally, EPA requested the spreadsheets of your model runs. As of this date, we have not received them and are thus unable to replicate your efforts. EPA will need the input files, output and model codes of whatever food web model we end up using in order to properly evaluate it.

EPA looks forward to continuing discussion with your project team to determine how to best link contaminant fate and transport processes with the food web model in order to ensure that we have the tools necessary to evaluate remedial action alternatives at the Portland Harbor Site.